

USANOVICH, M.I.

BEKTUROV, Ye.A.; USANOVICH, M.I.

Physicochemical analysis of unbalanced systems. Vest. AN Kazakh.
SSR 13 no.8:83-89 Ag '57. (MLRA 10:9)
(Systems (Chemistry)) (Chemistry, Physical and theoretical)
(Chemical equilibrium)

AUTHOR USANOVICH, M., KLIMOV, V., and SUMAROKOVA, T., ~~SECRET~~
 TITLE On the Electrolytic Dissociation of Tin and Antimony Complex
 20-2-34/67
 Compounds.
 (Ob elektroliticheskoy dissotsiatsii kompleksnykh soyedineniy
 olova i sur'my - Russian)
 PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 2, pp 364-365,
 (U.S.S.R.)
 Received 6/1957 Reviewed 7/1957
 ABSTRACT The development of electro-conductivity in systems that consists
 of non-conductive components is connected with a reciprocal acid-
 basic effect. As a result of the latter complex, saline compounds
 develop. On the occasion of the mixing of halides of quadrivalent
 tin and trivalent antimony with monocarbon acids of the aliphatic
 series and with their composed ethers electrolyses according to
 a general formula develop: $\text{SnX}_4.3\text{RCOOR}'$, $\text{SnX}_4.4\text{RCOOR}'$, $\text{SbX}_3\text{RCOOR}'$,
 $2\text{SbX}_3\text{RCOOR}'$, where R' denotes hydrogen or an aliphatic radical,
 and X denotes Cl or Br. The way of the electrolytic dissociation
 is shown in 4 reaction formulae (1-4) or equations respectively.
 From the equations 1. and 2. it becomes manifest that in the com-
 pounds $\text{SnX}_4.3\text{RCOOR}'$ and $\text{SnX}_4.4\text{RCOOR}'$ the organic molecule is a
 component of the cation and of the anion, whereas the halide of
 the quadrivalent tin only appears in the cation (equation 3 and
 4). For the purpose of examining the shemes of the electrolytic
 dissociation tin chloride was investigated in methanol, acetic

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On the Electrolytic Dissociation of Tin
and Antimony Complex Compounds.

~~SECRET~~
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acid and ethyl acetate, where the organic compound contained the isotope C¹⁴. In each case SnCl₄ was carried to the anode as well as to the cathode. This harmonizes with the equations 1 and 2. While this paper was being written, two essays were published (Miskidzh'van; Kuz'mina and Vol'nov) in which the authors suggest own schemes of the electrolytic dissociation of complex compounds. These schemes have in common that the formation of complex compounds is meant to represent an incorporating reaction, i.e. the molecule of the organic matter is to be a component of the complex cation. The experiments of the authors of the present paper contradict these schemes. For only the complex compounds of the 3-halides of antimony (and arsenic) with organic oxygen containing substance are incorporation products. The compounds of the same organic substances with the 4-halides of tin are not incorporation products. In the case of electrolysis according to the equation 3 the authors of the present paper have added methyl-red in addition to the acid marked with C¹⁴. As expected, the pigment moved into the same direction as the acetic acid, that is towards the cathode.
(With 8 citations from publications).

Card 2/3

On the Electrolytic Dissociation of Tin and Antimony Complex
Compounds.

20-2-34/67

ASSOCIATION Institute for General and Anorganic Chemistry "KURSANOV, N.S."
of the Academy of Sciences of the U.S.S.R.
PRESENTED BY CHERNYAYEV, I.I., Member of the Academy.
SUBMITTED 23.10.1956.
AVAILABLE Library of Congress.
Card 3/3

TIKHOV, Gavriil Adrianovich, akademik [deceased]; USANOVICH, M.I.,
otv.red.; RZHONDKOVSAYA, L.S., red.; PROKHOROV, V.P., tekhn.red.

[Principal works in five volumes] Osnovnye trudy v piati tomakh.
Alma-Ata, Izd-vo Akad.nauk Kazakhskoi SSR. Vol.5. [Botany, Mars,
life in the universe, physics, astrophysics, and atmospheric optics;
1912-1958] Botanika, Mars, zhizn' vo Vselennoi, fizika, astrofizika
i atmosfernaia optika, 1912-1958. 338 p. (MIRA 13:9)

1. Chlen-korrespondent Akademii nauk SSSR; AN KazSSR (for Tikhov).
2. Chlen-korrespondent Akademii nauk KazSSR (for Usanovich).
(Plants--Optical properties) (Life on other planets)
(Astrophysics)

AUTHOR: Usanovich, M.

SCV/20-120-6-39/59

TITLE: On the Deviations From Raoult's Law Due to the Chemical Interaction Between the Components (Ob "otstupleniyakh" ot zakona Raulya, vyzyvayemykh khimicheskimi vzaimodeystviyem mezhdu komponentami)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 120, Nr 6, pp 1304 - 1306 (USSR)

ABSTRACT: The deviations from Raoult's law are generally explained by the fact that the forces of the cross-wise interaction (perekretnoye vzaimodeystviye) between the molecules of the components differ from the arithmetic mean of the forces of the intermolecular interaction in each of the individual components. This apparently convincing explanation is insufficient and doubtful. The substance produced by the chemical interaction can exhibit a greater volatility than the components, if only in rare cases. In this case a positive deviation from Raoult's law occurs in spite of the chemical interaction and even a positive azeotropic substance can be produced. Secondly the chemical interaction can lead to positive deviations (partial vapor pressures) from Raoult's law and this may also occur if non-volatile products

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On the Deviations From Raoult's Law Due to the
Chemical Interaction Between the Components

SOV/20-120-6-39/59

are formed. If the reaction $mA + nB \rightleftharpoons A_m B_n$ (where $A_m B_n$ denotes a non-volatile substance) proceeds in a system composed of two non-associated components, a positive deviation from Raoult's law is possible at $m=n=1$. If, however, only one of the stoichiometrical coefficients differs from unity a positive deviation of at least one partial vapor pressure must occur. The basic considerations leading to this result are discussed. The positive deviation of vapor pressure is due to the chemical interaction and not to some other causes. The inversion of the sign of the deviations from the additive value is uniquely determined by the stoichiometrical coefficients of the reaction equation $mA + nB \rightleftharpoons A_m B_n$ and is independent from the thoroughness of the chemical interaction. The considerations discussed, of course, are only valid for the chemical interactions of the components of one solution. There are 2 figures.

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On the Deviations From Raoult's Law Due to the
Chemical Interaction Between the Components

SOV/20-120-6-39/59

ASSOCIATION: Kazakhskiy gosudarstvennyy universitet im. S. M. Kirova
(Kazakh State University imeni S. M. Kirov)

PRESENTED: March 4, 1958, by V. A. Kargin, Member, Academy of Sciences,
USSR

SUBMITTED: February 3, 1958

1. Chemical reactions--Theory 2. Solutions--Chemical reactions

Card 3/3

5 (3,4)

AUTHORS:

Sergeyeva, V. F., Usanovich, M. I.

SOV/79-29-4-74/77

TITLE:

The Influence of Some Electrolytes on the Solubility of Benzoic Acid in Water (Vliyaniye nekotorykh elektrolitov na rastvorimost' benzoynoy kisloty v vode)

PERIODICAL:

Zhurnal obshchey khimii, 1959, Vol 29, Nr 4, pp 1393 - 1397 (USSR)

ABSTRACT:

The solubility of benzoic acid was the object of the investigation of some research workers (Refs 1-5). The data on their solubility in aqueous solutions of sodium- and lithium chloride, potassium-, tetramethyl ammonium-, tetraethyl ammonium-, and ethyl pyridinium iodide are given here. Sodium- and lithium chlorides as well as potassium iodide reduce the solubility of benzoic acid in water, tetramethyl ammonium, tetraethyl ammonium- and ethyl pyridinium iodide increase it. The solubility of the benzoic acid in tetraethyl ammonium iodide-, ethyl pyridinium iodide was investigated and it was found that these electrolytes are good solvents for this acid. An interpretation of the effect of "salting" in the case of this solution process is suggested. The solubility of the nonelectrolytes is in the case of an addition of the electrolytes in-

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The Influence of Some Electrolytes on the Solubility of Benzoic Acid in Water **SOV/79-29-4-74/77**

creased if the electrolyte to be added is a better solvent than water for the nonelectrolyte concerned. The solubility of benzoic acid in ethyl alcohol and in the alcohol solution of the ethyl pyridinium iodide was investigated. Ethyl pyridinium iodide reduces the solubility of the benzoic acid in alcohol. The effect of the "salting out" is equally interpreted as that of "salting". The tables illustrate in numbers, the figure by means of curves the solubility of benzoic acid in water and in the given compounds. There are 1 figure, 4 tables, and 13 references, 1 of which is Soviet.

ASSOCIATION: Kazakhskiy gosudarstvennyy universitet (Kazakh State University)

SUBMITTED: February 10, 1958

Card 2/2

5(4)

AUTHORS: Usanovich, M., Dembitskiy, A.

SCV/79-29-6-2/72

TITLE: Vapor Pressure of Systems Formed From Stannic Chloride With Esters (Davleniye para sistem, obrazuyemykh khlornym olovom so slozhnymi efirami)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 6, pp 1771-1781 (USSR)

ABSTRACT: On the investigation of the vapor pressure of the system $\text{SnCl}_4 - \text{C}_6\text{H}_5\text{OH}$ a positive deviation from Raoult's law was found when a chemical reaction took place in the system (Ref 1). This fact which is rather strange at first sight was explained by the reduction of the number of molecules at the formation of the compound $\text{SnCl}_4 \cdot 4\text{C}_6\text{H}_5\text{OH}$. Since in systems formed from SnCl_4 and esters the reaction between the components yields the compounds $\text{SnCl}_4 \cdot 2\text{A}$ (Refs 2-8), the authors investigated the vapor pressure of these systems and assumed that this vapor pressure had to involve a positive deviation from Raoult's law as well as a complementary proof of the concepts regarding composition and

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Vapor Pressure of Systems Formed From Stannic Chloride With Esters

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structure of the complex compounds of stannic chloride with esters (Refs 8-11). The report recently published by Yu. N. Vol'nov (Ref 12) on the vapor pressure of these three systems is used as basis of the present paper because there not only the general but also the partial pressure is determined; besides the present data are not in agreement with those obtained by Vol'nov. In systems formed from SnCl_4 and the esters HCOOC_4H_9 , $\text{CH}_3\text{COOC}_2\text{H}_5$, $\text{C}_2\text{H}_5\text{COOC}_2\text{H}_5$, $\text{CH}_3\text{COOC}_4\text{H}_9$, $\text{C}_2\text{H}_5\text{COOC}_4\text{H}_9$, and iso- $\text{CH}_3\text{COOC}_5\text{H}_{11}$ the partial vapor pressure of stannic chloride shows deviations with change of sign and the vapor tension of the esters negative deviations from the additive straight line. It can be concluded from the progress of the curves of the partial vapor pressure that the vapor pressure reflects the formation of compounds with more than two molecules of the ester per one molecule SnCl_4 . Tables and figures illustrate the results obtained. There are 3 figures, 13 tables, and 15 references, 13 of which are Soviet.

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Vapor Pressure of Systems Formed From Stannic
Chloride With Esters

SOV/79-29-6-2/72

ASSOCIATION: Institut khimicheskikh nauk Akademii nauk Kazakhst'oy SSR
(Institute of Chemical Sciences of the Academy of Sciences,
Kazakhskaya SSR)

SUBMITTED: May 7 1958

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5(4)

AUTHORS:

Usanovich, M., Dembitskiy, A.

SOV/79-29-6-3/72

TITLE:

Vapor Pressure of the Systems $\text{SnCl}_4\text{-CCl}_3\text{COOC}_2\text{H}_5$ and $\text{SnCl}_4\text{-C}_6\text{H}_5\text{OCH}_3$ (Davleniye para sistem $\text{SnCl}_4\text{-CCl}_3\text{COOC}_2\text{H}_5$ i $\text{SnCl}_4\text{-C}_6\text{H}_5\text{OCH}_3$)

PERIODICAL:

Zhurnal obshchey khimii, 1959, Vol 29, Nr 6, pp 1781-1785 (USSR)

ABSTRACT:

In a previous paper (Ref 1) it was shown that in systems formed from stannic chloride and esters the partial vapor pressure of stannic chloride shows deviations with change of sign, and the partial pressure of the esters negative deviations from the additive straight line owing to the formation of the compounds $\text{SnCl}_4 \cdot 2\text{RCOOR}'$ and $\text{SnCl}_4 \cdot 3\text{RCOOR}'$ in these systems. In the present paper the investigation results of the vapor pressure of the systems $\text{SnCl}_4\text{-CCl}_3\text{COOC}_2\text{H}_5$ and $\text{SnCl}_4\text{-C}_6\text{H}_5\text{OCH}_3$ are given. These systems differ from those previously investigated (Ref 1) by the absence of the electric

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Vapor Pressure of the Systems $\text{SnCl}_4\text{-CCl}_3\text{COOC}_2\text{H}_5$
and $\text{SnCl}_4\text{-C}_6\text{H}_5\text{OCH}_3$

SOV/79-29-6-3/72

conductivity since in them the complex formation stops in the stage of formation of the compounds having the composition 1 : 2 (Refs 2,3). It was therefore to be expected that this difference would also appear in the diagrams of the vapor pressure. The total and the partial vapor pressures of the systems $\text{SnCl}_4\text{-C}_6\text{H}_5\text{OCH}_3$ and $\text{SnCl}_4\text{-CCl}_3\text{COOC}_2\text{H}_5$ were investigated and the evaporation heats of these systems determined. The results obtained confirm the presence of the compounds $\text{SnCl}_4 \cdot 2\text{C}_6\text{H}_5\text{OCH}_3$ and $\text{SnCl}_4 \cdot 2\text{CCl}_3\text{COOC}_2\text{H}_5$ which seem to have a noticeable vapor pressure. Vapor pressures and evaporation heats are given in the figures and tables. There are 2 figures, 4 tables, and 4 Soviet references.

ASSOCIATION: Institut khimicheskikh nauk Akademii nauk Kazakhskoy SSR
(Institute of Chemical Sciences of the Academy of Sciences, Kazakhskaya SSR)

SUBMITTED: May 7, 1958
Card 2/2

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SOV/20-128-3-35/58

AUTHOR: Usanovich, M.

TITLE: "Deviations" From Raoult's Law

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 3, pp 561-563 (USSR)

ABSTRACT: The present paper is intended to analyze a further cause of the said "deviations" of vapor tension from Raoult's law. Previously (Ref 1) the author discussed such deviations in a binary system, the components of which chemically react with each other. Besides, it is attempted to show in what way the same causes influence the melting diagrams and the cryoscopic determination of the molecular weight. The author presupposes that one of the components of the binary system is dimeric, and the system follows Raoult's law. Besides, it must be assumed that - in the construction of the diagram of the dependence of vapor tension of the system on its composition - the formula-true molecular weight of component A is used for the calculation of its molar fraction, i.e. the calculation is carried out for the monomer. In this case, the diagram has the shape shown in figure 1. "Deviations" from Raoult's law can be seen although in fact there are no deviations whatsoever. The vapor tensions (partial and total) are not represented by additive lines only because a wrong mole-

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"Deviations" From Raoult's Law

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cular weight of component A was taken for the calculation. In building up the above diagram, the author assumes that the dimer involved does not decompose by dilution with an indifferent component B. If this condition is not fulfilled, and if the constant of dissociation of dimeric molecules to simple molecules is small, the diagram is only distinguished by the fact that all curves of vapor tension will touch the additive lines near coordinate B. Besides, the author discusses the shape of the melting diagrams with and without chemical interaction, in the latter case with an associating component. Considering the change in molar fractions, the author built up liquidus curves of substance A at different interrelations with the 2nd component B. Curve I (Fig 2) represents the "ideal" solubility of A (missing interaction $y = 0$). In the case of a formation of connection AB (on complete reaction), curve II originates; curve III corresponds to the formation of A_2B (T. N. Sumarokova found similar conditions in studying experimental data (Ref 2)). If AB_2 is formed, the molar fraction of A becomes larger due to the interaction as compared with the initial one. The crystallization temperatures lie then by $x \leq 1$ to $x = 0.5$ higher than the

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"Deviations" From Raoult's Law

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"ideal" curve I (Fig 3). If component B is associated (dimerized) and does not interact with A, curve III is formed (Fig 3). It intersects with curve I in the point $x = 0.5$. Here, curve I also intersects with curve II (Fig 4) which corresponds to connection A_2B_2 . This yields some practical conclusions with respect to cryoscopic measurements of the molecular weight. There are 4 figures and 2 Soviet references.

ASSOCIATION: Institut khimicheskikh nauk Akademii nauk KazSSR
(Institute of Chemical Sciences of the Academy of Sciences,
Kazakh SSR)

PRESENTED: May 21, 1959, by V. A. Kargin, Academician

SUBMITTED: March 25, 1959

Card 3/3

USANOVICH, M.; AKSEL'ROD, S.

Physicochemical study of the system Na^+ , Mg^{++} , Cl^- , SO_4^{--} , H_2O .
Part 2: Electric conductivity, viscosity, and density of the
ternary system Na^+ , Cl^- , SO_4^{--} , H_2O . Izv. AN Kazakh. SSR. Ser.
khim. no.1:3-14 '60. (MIRA 13:11)
(Systems (Chemistry)) (Salt) (Sodium sulfate)

USANOVICH, M.; SEKUNOV, G.

Physicochemical study of the system Na^+ , Mg^{++} , Cl^- , SO_4^{--} - H_2O .

Electric conductivity, viscosity, and density of the ternary system Na^+ , Mg^{++} , SO_4^{--} - H_2O . Izv. AN Kazakh. SSR Ser. khim. no. 2:3-9 1960.

(MIRA 14:5)

(Systems (Chemistry))

SERGENYEV, V.F.; USANOVICH, M.I.

Effect of tetraethylammonium iodide on the solubility of
benzoic acid in water, ethyl alcohol, and their mixtures.
Izv. vys. ucheb. zav; khim. i khim. tekhn. 3 no. 5:834-835
'60. (MIRA 13:12)

(Benzoic acid) (Ammonium compounds)

USANOVICH, M.I.; BEKTUROV, Ye.A.

Time factor in the physicochemical analysis of liquid systems. Part 1: System $C_5H_5N - CH_2ClCOOH$. Izv. vys. ucheb. zav; khim. i khim. tekhn. 3 no. 5:837-843 '60.
(MIRA 13:12)

1. Kazakhskiy gosudarstvennyy universitet imeni S.M. Kirova.
Kafedra fizicheskoy khimii.
(Systems (Chemistry))

USANOVICH, M.I.; KALABANOVSKAYA, Ye.I.

Systems formed by the complex acid $\text{SnCl}_4 \cdot 2\text{CH}_3\text{COOH}$ with water, ethyl ether, acetic acid, and nitromethane. *Izv.vys.ucheb.zav.; khim. i khim.tekh.* 3 no.6:991-996 '60. (MIRA 14:4)

1. Kazakhskiy gosudarstvennyy universitet imeni S.M.Kirova i
Sredneaziatskiy gosudarstvennyy universitet imeni V.I.Lenina.
(Systems (Chemistry))

S/079/60/030/04/64/080
B001/B011

AUTHORS: Klimov, V., Sumarokova, T., Usanovich, M.

TITLE: On the Structure of the Complex Compound
 $\text{SnCl}_4 \cdot 2\text{CH}_3\text{COOH} \cdot 2\text{NH}_2\text{CH}_2\text{COOH}$

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 4, pp. 1334-1336

TEXT: The complex compound $\text{SnCl}_4 \cdot 2\text{NH}_2\text{CH}_2\text{COOH} \cdot 2\text{CH}_3\text{COOH}$ (Ref. 1) was separated upon the action of tin chloride on the solution of glycocoll in anhydrous acetic acid. The same complex compound was also obtained by the addition of two molecules CH_3COOH to the complex acid $\text{SnCl}_4 \cdot 2\text{NH}_2\text{CH}_2\text{COOH}$. The cryoscopic ^v determinations of the molecular weight of the compound $\text{SnCl}_4 \cdot 2\text{NH}_2\text{CH}_2\text{COOH} \cdot 2\text{CH}_3\text{COOH}$, made in CH_3COOH , showed that the molecular weight determined constitutes $1/3$ of the formula molecular weight, and thus, that this compound dissociates into three ions. On the strength of these data, the mixed complex compound was assumed to appear as the product of an acid basic reaction of the complex acid $\text{SnCl}_4 \cdot 2\text{NH}_2\text{CH}_2\text{COOH}$ with CH_3COOH and the latter,

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On the Structure of the Complex Compound
 $\text{SnCl}_4 \cdot 2\text{CH}_3\text{COOH} \cdot 2\text{NH}_2\text{CH}_2\text{COOH}$

S/079/60/030/04/64/080
 B001/B011

with its clear basic properties, to add on in the outer sphere (Ref. 1).
 Structure $[\text{SnCl}_4(\text{NH}_2\text{CH}_2\text{COO})_2]^{2-} \cdot 2\text{CH}_3\text{COOH}^+$ was therefore ascribed to compound $\text{SnCl}_4 \cdot 2\text{NH}_2\text{CH}_2\text{COOH} \cdot 2\text{CH}_3\text{COOH}$. To obtain a confirmation of this assumption, the authors decided to investigate the ion transfer in the acetic acid solutions of compound $\text{SnCl}_4 \cdot 2\text{NH}_2\text{CH}_2\text{COOH} \cdot 2\text{CH}_3\text{COOH}$, by utilizing the labelled preparations $\text{NH}_2\text{CH}_2\text{C}^*\text{OOH}$ and $\text{CH}_3\text{C}^*\text{OOH}$. They expected that glycocoll, a component of the anion $[\text{SnCl}_4 \cdot (\text{NH}_2\text{CH}_2\text{COO})_2]^{2-}$, would move to the anode, and CH_3COOH to the cathode, on the action of electric current. It was found, however, that glycocoll, labelled with the isotope C^{14} , moves to the cathode, i.e. it is a component of the cation; CH_3COOH labelled with the isotope C^{14} goes mostly over to the anode, and is therefore a component of the anion. The complex compound has therefore the structure: $[\text{SnCl}_4(\text{CH}_3\text{COO})_2]^{2-}(\text{NH}_3\text{CH}_2\text{COO})^+$. There are 1 table and 3 Soviet references.

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On the Structure of the Complex Compound
 $\text{SnCl}_4 \cdot 2\text{CH}_3\text{COOH} \cdot 2\text{NH}_2\text{CH}_2\text{COOH}$

S/079/60/030/04/64/080
B001/B011

ASSOCIATION: Institut khimii Akademii nauk Kazakhskoy SSR (Institute of
Chemistry of the Academy of Sciences, Kazakhskaya SSR)

SUBMITTED: May 6, 1959

Card 3/3

USALOVICH, M.; LECTURE, Te.

Time factor in the physicochemical analysis of liquid systems.
Part 2: Systems $C_5H_{12}N - C_4H_9Br$ and $C_5H_{12}N - C_4H_9I$. Izv.vys.ucheb.
zav.khim.i.khim.tekh. 7, no.3:374-378 '61. (MIRA 14:10)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova,
kafedra fizicheskoy khimii.
(liquids)
(Systems(Chemistry))

USANOVICH, M.; BEKTUROV, Ye.

Time factor in the physicochemical analysis of liquid systems.
Part 3: Acetic anhydride - water system. Izv.vys.ucheb.zav.;khim.i
khim.tekh. 4 no.4:574-579 '61. (MIRA 15:1)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova, kafedra
fizicheskoy khimii.

(Acetic anhydride) (Systems (Chemistry))

1.
C. USANOVICH, M.; PICHUGINA, Ye.

Compounds of tin chloride and tin bromide with aniline. Zhur.ob.
khim. 31 no.5:1648-1649 My '61. (MIRA 14:5)

1. Kazakhskiy gosudarstvennyy universitet.
(Tin compounds)

USANOVICH, M.; PICHUGINA, Ye.; KALISTRATOVA, A.

Tin chloride - o-nitroanisol system. Zhur.ob.khim. 31 no.6:
1759-1761 Je '61. (MIRA 14:6)

1. Kazakhskiy gosudarstvennyy universitet imeni S.M.Kirova.
(Tin chloride) (Anisole)

USANOVICH, M.I.; NURMAKOVA, A.K.; SUMAROKOVA, T.N.

Complexing reactions of pentavalent antimony. Part 1: Carboxylic acids. Zhur. ob. khim. 31 no. 11:3493-3500 N '61. (MIRA 14:11)

1. Institut khimicheskikh nauk AN Kazakhskoy SSR.
(Antimony compounds) (Acids, Organic)

DEMBITSKIY, A.; SUMAROKOVA, T.; USANOVICH, M.

Structure of complex compounds of stannic chloride with esters. Dokl.
AN SSSR 137 no.6:1357-1360 Ap '61. (MIRA 14:4)

1. Institut khimii AN KazSSSR. Predstavleno akademikom A.N.
Tereninym.

(Tin compounds)

SLASHCHEVA, L.A.; USANOVICH, M.I.; SUMAROKOVA, T.N.

Complex compounds of monovalent copper with thiourea. Part 1:
Compounds of cuprous chloride and bromide. Zhur.ob.khim. 32
no.3:683-688 Mr '62. (MIRA 15:3)
(Copper compounds) (Urea)

SLASHCHEVA, L.A.; USANOVICH, M.I.; SUMAROKOVA, T.N.

Complex compounds of monovalent copper with thiourea. Part 2:
Compounds of cuprous chloride. Zhur.ob.khim. 32 no.8:2408-2411
Ag '62. (MIRA 15:9)
(Copper chloride) (Urea)

SLASECHEVA, L.A.; USANOVICH, M.I.; SUMAROKOVA, T.N.

Complex compounds of monovalent copper with thiourea, Part 3:
Compounds of cuprous sulfate. Zhur.ob.khim. 32 no.8:2412-2415
Ag '62. (MIRA 15:9)
(Copper sulfate) (Urea)

USANOVICH, M.I.; YAKUSHEVA, Z.P.

Conductometric titration of the system $H_2SO_4 - ZnSO_4 - Na_2SO_4$.
Zhur.prikl.khim. 35 no.2:447-449 F '62. (MIRA 15:2)

1. Kazakhskiy gosudarstvennyy universitet imeni A.M.Kirova.
(Sulfates) (Conductometric analysis)

L 13096-63

EPF(c)/EWP(j)/BDS/EWT(m)

Pr-4/Pc-4 HI/HH

ACCESSION NR: AP3003410

S/0051/63/015/001/0048/0051

AUTHOR: Dembitskiy, A.D.; Sumarokova, T.N.; Usanovich, M.I.

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TITLE: Raman spectra of systems formed by stannic chloride and esters. Part.3.

SOURCE: Optika i spektroskopiya, v.15, no.1, 1963, 48-51

TOPIC TAGS: Raman spectrum, stannic chloride, ester, methylbutyrate

ABSTRACT: In earlier studies the authors (Doklady AN SSSR, 137, 1357, 1961 and Optika i spektroskopiya, 12, 359, 484, 1962) showed that the addition of stannic chloride to esters leads to weakening and eventual disappearance of the C=O stretching vibration band at 1735 cm^{-1} as the compound $\text{SnCl}_4 \cdot 2\text{ROOR}$ is approached, and that at the same time there appears in the spectrum a band at about 1630 cm^{-1} associated with vibrations of the C=O band in the ester. Also, the band at 403 cm^{-1} , due to antisymmetric Sn-Cl vibrations, in the stannic chloride molecule shifts towards lower frequencies (to 340 cm^{-1}). In view of this it was deemed of interest to investigate the intensities of the 1630 , 1735 and 403 cm^{-1} lines for the purpose of evaluating the concentrations of the free components and products. Methyl butyrate was chosen for the study on the basis of preliminary experiments which showed that the given system is particularly suitable for such studies. The Raman spectra were recorded photographically by means of an ISP-51 spectrograph. The Card 1/2

L 13096-63

ACCESSION NR: AP3003410

spectra were scanned on an MF-4 microdensitometer. The results for pure methyl butyrate and this ester with 50 mole percent stannic chloride are tabulated; they show that, as in the case of other esters, with addition of SnCl_4 the 1735 cm^{-1} band broadens and shifts to lower frequencies. The results of further measurements with stannic chloride concentrations from 0 to 100% are tabulated and presented in the form of a diagram. Calculations based on the experimental data show direct proportionality between the line intensities and the volume concentration. Thus, measurement of Raman line intensities provides a means for evaluating the equilibrium concentrations in SnCl_4 + ester systems. Orig.art.has: 3 formulas, 3 figures and 2 tables.

ASSOCIATION: none.

SUBMITTED: 25Oct62

DATE ACQ: 30Jul63

ENCL: DO

SUB CODE: CH,PI

NO SOV REF: 010

OTHER: 003

Card 2/2

USANOVICH, M.

Amphoteric properties of HNO_3 and the nitronium ion. Izv.
AN Kazakh. SSR. Ser. khim. nauk 14 no.1:5-8 Ja-Mr '64.

(MIRA 18:3)

NURMAKOVA, A.K.; USANOVICH, M.I.; SUMAROKOVA, T.N.

Complex-forming reactions of pentavalent antimony. Part 3: Complex
compounds of the type $SbCl_5 \cdot AC$ and $SbCl_5 \cdot AC \cdot B$. Zhur., ob.khim. 34
no.1:3-7 Ja '64. (MIRA 17:3)

USAREWICZ, B.

The use of polyvinyl chloride in the furniture industry. p. 12.

PRZEMYSŁ DRZEWNY. (Centralne Zarządy Przemysłów: Drzewnego, Meblarskiego, i
Leśnego i Stowarzyszenie Inżynierów i Techników Leśnictwa i Drzewnictwa)
Warszawa, Poland, No. 1, Jan. 1959.

Monthly list of East European accession (EEAI), LC, VOL. 8, NO. 9, September,
1959. Uncl.

USAROV, V.
25695

Imeni Brat'ev Suxhchikh I Burgulovyykh-Istoriya Odnogo Kolkhoza. s. Doron-
inskoye ulet. Rayona Chit. Cbl. Zabaykalyye, Kn. 1, 1947, s. 240-66

SO: IETOPIS NO. 30, 1948

USAROV, V.

25695 USAROV, V.

Imeni' basket'ya Gorbol'nikh i Gorbol'nikh. In: *Imeni' basket'ya Gorbol'nikh i Gorbol'nikh*.
Zabarkalyye, Khl. 1, 1947, s. 240-66.

SO: Ietopis' Zhurnal'nich Statoy, No. 3, Moskva, 1948

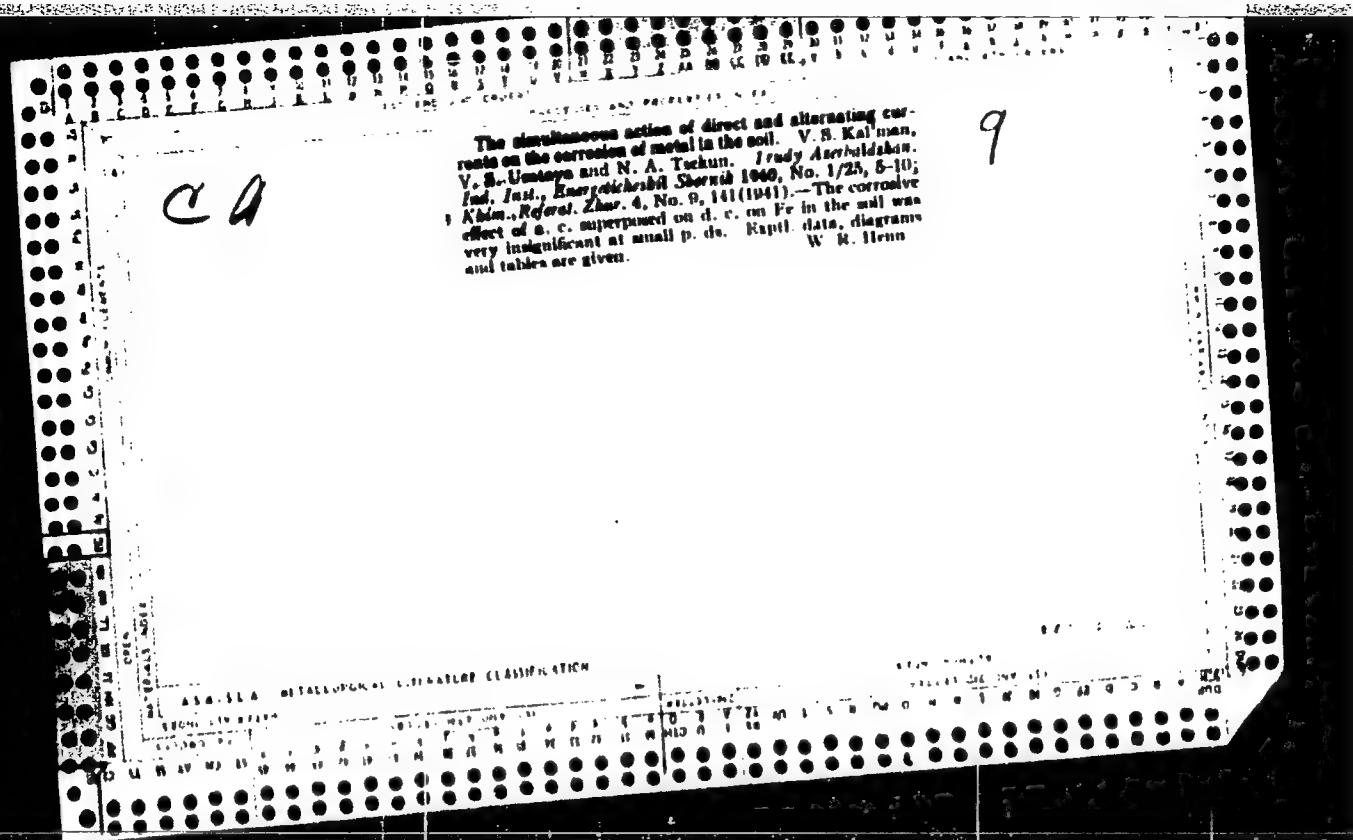
USARCV, Vikentiy Pavlovich

[Toward new frontiers; agriculture of Chita Province on
the eve of the 22d Congress of the CPSU] Na novye rubazhi;
sel'skoe khoziaistvo Chitinskoi oblasti k XXII s"ezdu KPSS.
Chita, Chitinskoe knizhnoe izd-vo, 1961. 49 p.
(MIRA 17:5)

USAROWICZ, L.

Survey of scientific research work on the economy of repairs. p. 286.
(PRZEGLAD TECHNICZNY, Vol. 75, No. 8, Aug. 1954, Warszawa, Poland)

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 3, No. 12, Dec.
1954, Uncl.



PROCESSING AND PREPARATION INDEX

4

Determination of ferric and ferrous iron in sulfate ores soluble in acids. B. B. Usataya. *Vsesoyuz. Nauch.-Issledovatel. Inst. Metal., Sbornik Trudov* 1941, No. 3 (No. 48), 20-4.—When these ores are normally dissolved in acids the H_2S evolved reduces a portion of the Fe^{+++} to Fe^{++} . U. claims that by the addn. of $SnCl_4 \cdot 5H_2O$ the reduction of the Fe^{+++} with the H_2S can be suppressed. By running two sets of detns., both with and without the $SnCl_4$, the true values of Fe^{++} and Fe^{+++} can be calcd. Results which check within 1% are reported on several synthetic mixts. of Fe_2O_3 and FeS . Harold J. Kandler

7

ASB-ELA METALLURGICAL LITERATURE CLASSIFICATION

GROUPS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

USATENKO, B.; ALLIKAS, V.; ROOSILEHT, A.; NETSAR, J., red.;
TÖNISSON, A., tekhn. red.

[Aquarium] Akvaarium. Tallinn, Eesti Riiklik Kirjastus,
1963. 383 p. (MIRA 16:12)
(Aquariums)

S/196/62/000/019/003/004
E194/E455

AUTHOR: Usatenko, S.T.

TITLE: The influence of mechanical working on the magnetic properties of alloy ANKo4 (ANKo4)

PERIODICAL: Referativnyy zhurnal, Elektrotékhnik i energetika, no.19, 1962, 4, abstract 19B19. (Sb. tr. In-ta elektrotekhn. AN UkrSSR, 15, 1961, 122-124)

TEXT: Magnets of ANKo4 (ANKo4) of dimensions 24 x 24 x 16 mm were used in tests on the influence of grinding under two sets of conditions: (1) - normal (vertical feed 0.2 mm, horizontal 0.4 mm) and (2) severe (0.65 and 1.2 mm respectively without cutting fluid). The temperature the magnets reached was, in the first case, 70 - 80°C and, in the second, 200 - 250°C. The mean loss of weight on working was 30%. It was found that for the majority of the magnets, irrespective of the grinding conditions, H_{sat} increases on average by 6% and B_r by 5%. There is a particularly great increase in the specific magnetic energy. The influence of mechanical working on the magnetic properties is less the higher B_r and H_{sat} of the material. In particular, a magnet with
Card 1/2

The influence of mechanical ...

S/196/62/000/019/003/004
E194/E455

$B_r = 11.2$ kilogauss and $H_{sat} = 510$ oersteds showed no appreciable change. It is supposed that additional forming of domains occurs during severe working. It is suggested that the improvement in magnetic properties may be due to structural changes caused by simultaneous heating and compression during grinding. 2 illustrations. 4 literature references. ✓

[Abstracter's note: Complete translation.]

Card 2/2

35283

3/716/01/015/000/000/015
22.7/2201

24,2200 (1147,1164,1182)

AUTHOR: Usatenko, S. A.

TITLE: Selecting permanent-magnet materials for magnetic systems

SOURCE: Akademiya nauk Ukrainy's'koyi RSR. Instytut elektrotekhniki. Sbornik trudov, v. 18, 1961. Voprosy magnitnykh izmereniy, 45-52

TEXT: The author lists properties of Soviet permanent-magnet materials and shows how to undertake selection for a particular application. Composition, remanence B_r (in gauss), coercive force H_c (in oersted), specific magnetic energy $(BH/8\pi)_{max}$ (in erg/cm³), and heat treatment during manufacture are tabulated for the following materials: (I) 'Al'ni' or AN (AN) alloys, consisting of Al, Ni and a few percent Cu; (II) 'Al'nisi' or ANK (ANK) alloys, consisting of Al, Ni and Si; (III) 'Al'niko' or ANKo (ANKo) alloys, containing Al, Ni and up to 12% Cu; (IV) 'Al'niko' or ANKo (ANKo) alloys containing

Card 1/2

Selecting permanent-magnet ...

3/716/61/015/353/355/315
B207/3301

Si, Al, Co, Cu and 0.15% Si; (V) AlNi (AlNi₁₀) alloys, consisting of Ni, Al, Co, Cu and Ti; (VI) a new high-coercivity alloy with $H_c = 1100$ Oe and $B_r = 8 \times 10^4$ G; (VII) foreign (no.-Soviet) alloys Alnico-IV and Ticonal-2A. By way of example, selection of a suitable material for an electric measuring instrument is discussed. Considerations of magnetic properties and cost showed that for this purpose the alloy AlNi₁₀ is best; its properties are $B_r = 9000$ G, $H_c = 650$ Oe, $(BH)_{max} = 9.7 \times 10^4$ erg/cm³. There are 3 figures, 2 tables and 6 Soviet-doc references. X

Card 2/2

U/718/61/018/000/002/019
0207/0301

AUTHORS: Revralava, N. Ye. and Usatenko, S. T.

TITLE: Distribution of the field intensity and the magnetic induction along a magnet in a closed magnetic circuit

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut elektrotehniki. Sbornik trudov, v. 18, 1961. Voprosy magnitnykh izmereniy, 78-85

TEXT: The authors measured the distribution of the magnetic field H and the magnetic induction B along a permanent magnet /Abstracter's note: Material not specified/ closed with a yoke of soft magnetic material. Two permanent magnets were tested; they were 75 and 100 mm long. At junctions between the ends of a permanent magnet and its yoke, an additional field H_a appeared because of discontinuity of magnetization at the junctions. The measured field H_m was a vector sum of H_a and an external applied field H_e . H_m varied con-

Card 1/2

Distribution of the ...

5/716/61/013/017/011/110
D207/D301

siderably along the magnets, being strongest at the magnet ends and weakest at the middle (in the neutral plane). This effect was stronger in the longer magnet and it decreased on increase of the magnetizing current. A similar but less marked effect was obtained for the measured magnetic induction: B_m was greater at the magnet ends. These variations of H_m and B_m along the magnet length were due to the additional field H_a which acted mainly at the magnet ends where it reinforced or opposed the external field. The authors recommend that measurements on permanent magnets closed by yokes be carried out in the middle parts of the magnets near or at the neutral plane. There are 6 figures and 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: R. L. Sanford and E. J. Barnett, *UK apparatus for magnetic testing at magnetizing forces up to 5000 oersteds*, J. Res. NBS, v. 23 (Sept., 1939).

Card 2/2

5/11/61/61/61/61/61/61
1207/1301

AUTHORS: Parmanov, I. G. and Yantenko, S. P.

TITLE: An instrument for quality control of Permalloy, using its permeability

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut elektrotekhniki. Sbornik trudov, v. 18, 1961. Voprosy inzhinernogo ismereniy, 119-121

TEXT: The authors describe an instrument for rejection of Permalloy samples, whose coercive force is too high. The quantity actually measured is the permeability: low permeability indicates that a sample has high coercive force and therefore it has to be rejected. Permeability μ is measured by means of a bridge circuit in which the unbalance current is almost linearly proportional to μ . Two adjacent arms of the bridge are coils with 10,000 turns of 13A (PEL) wire of 0.29 mm diameter; the two other arms are Ohmic resistors. A standard Permalloy sample with known coercive force

Card 1/2

An instrument for ...

3/716/61/016/000/017/010
9207/3301

is placed in one of the coils. A test sample is placed in the other coil. The measuring part of an apparatus G-12 (2s-52) is used as the bridge indicator. A rectifier with 1A6 (20V) diodes is used as the power pack. The instrument is suitable for testing Permalloy sheet of 0.2 - 1 mm thickness under factory conditions. There are 1 figure and 2 Soviet-bloc references. ✓

Card 2/2

5/776/67/012/000/011/011
5207/0301

AUTHOR: Usutenko, S. I.

TITLE: The effect of mechanical treatment on the magnetic properties of the AlNiCo_4 alloy

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut elektrotekhniki. Sbornik trudov, v. 18, 1961. Voprosy magnitnykh izmereniy, 122-124

TEXT: The effects of grinding on the magnetic properties of permanent magnets, made of the AlNiCo_4 alloy are reported. Such magnets are used in electrical measuring instruments. The magnets were ground either (a) under the usual manufacturing conditions (heat evolved raised the sample temperature to $70 - 80^\circ\text{C}$) or (b) under extreme conditions of fast grinding without cooling (the temperature rose to $200 - 250^\circ\text{C}$). Grinding reduced the magnet weight by 50% and the cross-section by 20 - 25%. Hysteresis curves, obtained ballistically, usually indicated an increase of the coercive force, H_c , by

Card 1/2

The effect of mechanical ...

8/716/61/013/000/010/010
5207/500

6%, and the remanence B_r by 5%. The specific energy ($BH/8$) rose quite appreciably, even when H_c and B_r were not affected or when they decreased. This was because of change of the shape of hysteresis curves ('bulging'). Magnetic flux was reduced by 20 - 30% after grinding, in proportion to the change of the cross-section and of B_r . The effects of grinding were greater in the magnets with initially low H_c and B_r . The results for the grinding treatment (b) were similar to those obtained by the treatment (a): H_c and ($BH/8$) rose. There are 2 figures and 4 Soviet-bloc references.

Card 2/2

L 30373-66

ACC NR: AT6008384

SOURCE CODE: UR/0000/65/000/000/0044/0047

AUTHOR: Usatenko, S. T.

ORG: Institute of Electrodynamics, AN UkrSSR (Institut elektrodinamiki An UkrSSR)

TITLE: The influence of the switching speed on the error of the pulsed-induction method

SOURCE: AN UkrSSR. Povysheniye tochnosti i avtomatizatsiya izmeritel'nykh sistem (Automating and increasing the accuracy of measuring systems). Kiev, Naukova dumka, 1965, 44-47

TOPIC TAGS: magnetic field measurement, magnetic induction, *switching circuit*

ABSTRACT: During the determination of the characteristics of magnetically rigid materials by means of the pulsed induction method, the switching of the magnetization current is carried out by means of a knife switch or some contact system. This brief note presents the results of tests which show that the switching speed of the magnetization current, i.e., the time between the switching off and switching on of the knife switch, affects the magnitude of the ballistic galvanometer deflection and thus influences the error of the measurement. The author recommends the use of switching contacts. Orig. art. has: 5 formulas and 1 figure and 2 tables.

SUB CODE: 3909/ SUBM DATE: 25Oct65 / ORIG REF: 002

Card 1/1 CC

33
B+1

PETROV, I.; KRAYNOV, A.; USATENKO, V.

Acetone fires can be extinguished with water. Pozh.delo 6 no.2:
19 F '60. (MIRA 13:5)

1. Nachal'nik teplofizicheskoy laboratorii TSentral'nogo
nauchno-issledovatel'skogo instituta protivopozharnoy oborony
(for Petrov). 2. Direktor zavoda iskusstvennogo volokna
TSentral'nogo nauchno-issledovatel'skogo instituta
protivopozharnoy oborony (for Kraynov). 3. Nachal'nik pozharnoy
komandy zavoda iskusstvennogo volokna TSentral'nogo nauchno-
issledovatel'skogo instituta protivopozharnoy oborony (for
Usatenko).

(Acetone)

(Fire extinction)

L 8160-66 EWT(m)/T-2/EWP(f)

ACC NR: AP5025066

SOURCE CODE: UR/0286/65/OCO/016/0116/0117

AUTHORS: ^{44.55}Kubata, M. K.; ^{64.55}Podol'nyy, A. I.; ^{64.55}Bursakov, A. V.; ^{64.55}Usatenko, V. G.;
^{44.55}Royenko, V. I.; ^{44.55}Prokopov, N. I.

ORG: none

TITLE: Cyclone air cleaner for internal combustion engines. Class 46, No. 174040 ³⁹
³

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 16, 1965, 116-117

TOPIC TAGS: internal combustion engine, air cleaner ^{23.44.55}

ABSTRACT: This Author Certificate presents a cyclone air cleaner for internal combustion engines as per Author Certificate No. 125974. The cleaner contains both cyclones and contact type air cleaning elements. To improve the air cleaning and dirt capacity of the unit (see Fig. 1) a reflector is placed between the cyclone exits and the air cleaning elements.

Card 1/2

UDC: 621.43.03
²

L 8160-66
ACC NR: AP5025066

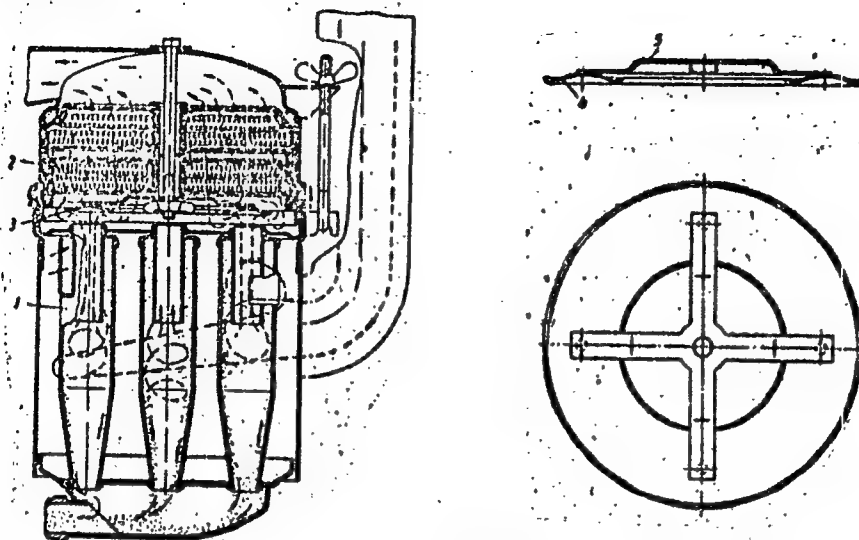


Fig. 1. 1- cyclones; 2- contact elements; 3- reflector; 4- ring;
5- cross-shaped member

Orig. art. has: 1 figure.

SUB CODE: PR, IE/ SUBM DATE: 22Jun64

Card 2/2 JW

14

ca

Determination of pH in natural waters. Yu. I. Us-
tenko. *Zavodskaya Lab.* 3, 940-8(1964). - A tentative
discussion with math. treatment of the detn. of pH in H_2O
on the basis of the bicarbonates and CO_2 in soln. C. B.

ASO-5LA METALLURGICAL LITERATURE CLASSIFICATION

72

A graphic method for calculating the barometric corrections in the volumetric determination of carbon. Yu. J. Umigeko, and N. D. Averkiev. *Zavodskaya Lab.* 3, 1125(1234).—The use of the logarithmic slide-disk specially designed for this purpose is recommended.
Chas. Blanc

ASB-5LA METALLURGICAL LITERATURE CLASSIFICATION

Be

A-3

PROCESSING AND PROPERTIES INDEX

Chemical composition of barometer correction
 data in the volumetric determination of carbon.
 J. J. Thompson and N. D. Avramov (Zavod. Lab.,
 1964, 3, 1156).—The C content is read directly
 from a rotating scale which automatically applies
 temp. and pressure corrections. H. I.

ASM-AIA METALLURGICAL LITERATURE CLASSIFICATION

62-112.441

GROUP 1

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Ca

Recs for drawings. Yu. I. Varentko, Zaslavskaya
Lab. 4, 462(1935).—Sat. 10 g. of $(CO)_2$ in a little H_2O
with $Fe(OH)_3$, filter off the excess of $Fe(OH)_3$, add concd.
solns. of 27 g. Na oxalate and 11.9 g. $NaFe(CN)_6$, apply
the mixt. to paper with a brush and dry in a dark room.
Develop the prints with 4% HCl or H_2SO_4 . C. B.

ca

7

Rapid determination of silicon in cast irons and steels
 Yu. I. Vantenko, Zashchita Lab. 4, 500 20 (USSR)
 Rapid determination is made possible by coagulating SiO_2 with gelatin without evapn. the soln. to dryness and igniting the residue. Further saving of time is effected by direct ignition of SiO_2 in an elec. furnace in a current of O_2 . The optimum procedure is based on studies of the influence of such factors as the concn. of the soln. and gelatin and of the boiling of the soln. before and after the addn. of gelatin. Dissolve 1 g. cast Fe or 5 g. steel in 40-50 cc. of HCl without bringing it to boiling, add 10-15 cc. of 0.5% gelatin soln. (prepd. without boiling), stir well, dil. with hot H_2O and filter immediately. Wash the ppt. twice with acidulated H_2O and then with hot H_2O to a neutral reaction, dry it a little with filter paper and ignite in a current of O_2 . Chas. Blum

2

CA

Determination of p_{H} in natural waters. Yu. I. Ustienko and A. A. Voltashchik. *Zavodskaya Lab.* 5, 438-8 (1936).—Previously a method was shown for calcg. p_{H} of waters on the basis of the bicarbonates and CO_2 in soln. by the equation: $p_{\text{H}} = 7.719 + \log (K/a)$, where K is bicarbonate hardness in German degrees, and a is dissolved CO_2 in mg./l. (*C. A.* 29, 2633⁷). The calcd. values agree well with the expil. data. The results differ by ± 0.05 p_{H} from the values obtained by the Michaelis colorimetric detn., and by ± 0.06 p_{H} from those by the electrometric detn. The p_{H} of natural waters is independent of the contents of salts of permanent hardness. With an increase of bicarbonates and a decrease of dissolved CO_2 , p_{H} increases. Chas. Hlane

Polarographic determination of copper in D5 (copper-chromium) steels. Yu. I. Usatenko and Yu. S. Lyalikov. *Zirodshaya Lab.* 6, 1394-8(1977); cf. Vorontsov, C. A. 32, 78-- in the polarographic detn. of small amts. of Cu (0.6%) in steels by the Thanheiser and Maassen method (cf. C. A. 31, 8438^a), satisfactory results can be obtained (cf. 30 min. by eliminating the evapn. to dryness of the soln. and the use of definite concns., because the results are not affected by the presence of excess Ni(OH)₂. Since the detn. is possible in the presence of Fe(OH)₃, the filtration of the soln. is not necessary. The expulsion of O from the soln. with pure N can also be omitted. Dissolve a 0.6-g. sample in 25 cc. of 60% HCl, oxidize with 2-3 cc. HNO₃ and boil to expel N oxides. Treat the soln. with excess NH₄OH to ppt. Fe(OH)₃, add 5 drops soln. with excess NH₄OH (0.25 g. in 100 cc. H₂O), make up the vol. of agar-agar soln. to 100 cc. and exam. with a polarograph. C. R.

7

CA

1ST AND 2ND ORDERS

PROCESSING AND PROPERTIES

Polarographic determination of nickel in special steels.
 Yu. S. Lyalikov and Yu. I. Lisutenko. Zashchita Lab.
 7, 1100-8(1938); cf. C. A. 32, 2439. -- Satisfactory
 results are reported in the detn. of Ni in steels in the pres-
 ence of a large excess of NH_4OH and the $\text{Fe}(\text{OH})_3$ ppt. by
 the method previously used for the detn. of Cu. Dissolve
 a 0.5-g. sample in 15 ml. of concd. HCl , oxidize with 2-3
 ml. HNO_3 , boil to expel N oxides, dissolve in a little water,
 add 5 drops of agar-agar soln., dil. to 100 ml. and polaro-
 graph beginning at 0.75 v. Cu in the soln. is detd. at 2
 potential breaks: 0.00 v. for $\text{Cu}^{++} \rightarrow \text{Cu}^+$ and 0.34 v. for
 $\text{Cu}^+ \rightarrow \text{Cu}$. Chas. Blanc

COMMON ELEMENTS

COMMON VARIANTS

ASB-6LA METALLURGICAL LITERATURE CLASSIFICATION

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CA

1

Determination of iron in chromite and ferrochrome.
 H. A. Nuzovskii and Yu. I. Usat'niko, *Zavodskaya Lab.*
 7, 1192-4(1938).—After the detn. of Cr in chromite and
 ferrochrome (cf. C. A. 33, 739), Fe^{+++} in the soln. can be
 detd. in the presence of a large excess of H_2O_2 by reducing
 it with Sn and titrating Fe^{++} with $K_2Cr_2O_7$ in the presence
 of dihydroxyamine indicator. Chas. Blane

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

GROUP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	

15

Determination of Calcium Oxide in Blast Furnace and Openhearth Slags Without Separation of Other Components. Yu. I. Uspenko. 8 pages. Henry Bratcher, Altadena, Calif. (Translation No. 1973.) From *Zavodskaya Laboratoriya*, v. 12, 1946, p. 919-921.

Describes a rapid method for calcium oxide in blast furnace and open-hearth slags, based on titration with permanganate, which does not require previous separation of iron, aluminum, manganese, magnesium, etc. 10 ref.

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSING AND PROPERTY INDEX																			
<p>16-257. Rapid Potentiometric Method for Copper Determination in Ferrous and Nonferrous Alloys. Iu. I. Usalenko and O. V. Datsenko. Factory Laboratory (U.S.S.R.), v. 13, Aug. 1947, p. 1009-1012. (In Russian.)</p> <p>A modification of the method of W. Hiltner and W. Grundmann. The time for a determination varies between 10 and 20 min., depending on the speed of solution of the test specimen. 10 ref.</p>																			
<p>ASB-11A METALLURGICAL LITERATURE CLASSIFICATION</p>										<p>ESTIMATE INDEX</p>									
<p>1ST AND 2ND ORDERS</p>										<p>3RD AND 4TH ORDERS</p>									

A Slag Control Method for Openhearth Furnaces. Yu. I. Usatenko. Henry Bratcher (Altadena, Calif.), Translation No. 2069, 1948, 10 pages. From *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, no. 12, 1947, p. 1430-1434.

Previously abstracted from original source under title: "Method for Control of the Slagging Process in Open-Hearth Furnaces."

1ST AND 2ND ORDERS										PROCESSES AND PROPERTIES INDEX										3RD AND 4TH ORDERS									
<p>5</p> <p>21</p> <p>THE RAPID DETERMINATION OF SILICA IN AGGLOMERATE. <u>Iu. I. Usatenko and P. A. Bulakhova.</u> (Zavodskaya Laboratoriya, 1948, vol. 14, Apr., pp. 492-493). (In Russian). The best conditions for the determination of silica in agglomerates, using 0.1% gelatin solution for coagulation, are considered, and a procedure is suggested which reduces by half the time required for this determination.</p> <p>S. h.</p>																													
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																													
1ST AND 2ND ORDERS										3RD AND 4TH ORDERS										5TH AND 6TH ORDERS									
1ST AND 2ND ORDERS										3RD AND 4TH ORDERS										5TH AND 6TH ORDERS									

1ST AND 2ND ORDERS										PROCESSES AND PROPERTIES INDEX										1ST AND 2ND ORDERS									
<p>5</p> <p>THE PERSULPHATE METHOD FOR THE DETERMINATION OF MANGANESE IN AGGLOMERATE AND IRON ORES. Yu. I. Usatanko and P. A. Bulabova. (Zavodskaya Laboratoriya, 1948, vol. 14, June, pp. 751-752). (In Russian). The results obtained in an experimental investigation of the determination of manganese by the persulphate method are given, and a modification of the usual procedure is suggested. S.K.</p>																													
<p>ASB-5LA METALLURGICAL LITERATURE CLASSIFICATION</p>																													
<p>COMMON ELEMENTS</p>										<p>COMMON ELEMENTS</p>										<p>COMMON ELEMENTS</p>									
<p>COMMON ELEMENTS</p>										<p>COMMON ELEMENTS</p>										<p>COMMON ELEMENTS</p>									

YU. I. USATENKO

PA 04/49T107

USBR/Minerals
Analysis - Methods
Organolites

Nov 48

"Determination of Calcium and Magnesium in Iron
Ores With the Aid of a Cationite," Yu. I.
Usatenko, O. V. Datsenko, Metal Factory Imeni
Dzerzhinsky, 5 pp

"Zavod Lab" Vol XIV, No 11, 1323-1327

Subject new method involves the use of organolites.
Difficulty of the method is that the determined
cationite is absorbed by wofelite R and in this
manner becomes separated from iron and aluminum
which remain in the solution in the form of
ions

64/49T107

USBR/Minerals

(Contd)

Nov 48

complex anions. This method was tried on pure
salts as a control and then used on various iron
ores.

64/49T107

15

Determination of Iron and Undissolved Residue in Ores Without Use of Mercuric Chloride and Phosphoric Acid. (In Russian.) Yu. I. Usatenko and P. A. Bulakhova. Zavodskaya Laboratoriya (Factory Laboratory), v. 14, Dec. 1948, p. 1420-1421.

Proposes, for the above, the use of phenylanthranilic acid having a much higher oxidation-reduction potential than trivalent iron, thus eliminating the necessity for phosphoric acid.

METALLURGICAL LITERATURE CLASSIFICATION

6-2

USSR/Chemistry - Phosphorus
Chemistry - Analytical

Feb 49

Determination of Phosphorus in Copper Phosphide and
Ferrophosphorus Using a "Cationite," Yu. I. Usatenko,
O. V. Datsenko, Metal Plant Imeni Dzerzhinskii, 2 pp

"Zvezd. Lab. Vol. XV, No 2 p. 145

Describes new method for phosphorus determination with
the aid of organoliths. Difficulty of method is that
copper, iron and other cations are absorbed by "cations-
ite" and are thus isolated from the phosphorus which
occurs in the filtrate in the form of orthophosphoric
acid. Latter is determined by volumetric means.

54/49709

USSR/Chemistry - Phosphorus (Contd)

Feb 49

Method was developed using pure salts, and confirmed
by using various salts of copper phosphorus and fer-
rophosphorus.

54/49709

USATENKO, YU. I.

M

92

***Determination of Lead in Babbitt Alloys by the Permanganate Method.**
Yu. I. Ustenko and O. V. Datsenko (*Zavod. Lab.*, 1949, 15, (2), 238-239).
[In Russian]. The Babbitt alloy (0.5 g.) is dissolved in 15 ml. HNO_3 (d = 1.20)
to eliminate the Sn and Sb which hinder analysis and which are filtered off.
The Pb in the filtrate is precipitated with hot ammonium oxalate, filtered off,
and the excess oxalate in the filtrate titrated with 0.2N KMnO_4 in dil. H_2SO_4 .
The presence of HNO_3 or of Cu up to 10% does not affect titration. T. O. L.

Jan. 1951

15

Rapid Determination of Calcium in Sinter Cakes. (In Russian.) Yu. I. Usatenko and P. A. Bulakhova. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 15, Mar. 1949, p. 362-363.

Describes procedure and reagents used. Time of determination is 1 hour, said to be several times less than for commonly used methods.

ASB-5LA METALLURGICAL LITERATURE CLASSIFICATION

GROUP

SECTION

SUBSECTION

ADDITIONAL

NOTES

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCEDURES AND PROPERTIES INDEX																			
15																			
<p>Determination of Molybdenum in Ferromolybdenum With the Aid of a Cation-Exchange Material. (In Russian.) Yu. I. Usat'ko and O. V. Datsenko. <i>Zavodskaya Laboratoriya</i> (Factory Laboratory), v. 15, July 1949, p. 779-781.</p> <p>Proposes new method for the above using sulfocarbonate. Course of analysis is described. Influence of different factors, such as acidity, is indicated.</p>																			
<p>ASPH-55A METALLURGICAL LITERATURE CLASSIFICATION</p>																			
<p>1ST AND 2ND ORDERS</p>										<p>3RD AND 4TH ORDERS</p>									

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
<div style="display: flex; justify-content: space-between;"> 5 21 </div> <p>Rapid Determination of Ferrous Oxide in Sinter. N. Z. Plotkin, Yu. I. Umstapko and P. A. Bulakhova. (Zavodskaya Laboratoriya, 1948, vol. 15, Aug., pp. 990-1000). (In Russian). The determination of ferrous oxide in sinter is carried out, in the method described, by finding the gain in weight of a finely ground sample after heating in a stream of air or oxygen at 1100° C. Preliminary experiments show that under these conditions complete oxidation of FeO to Fe₂O₃ occurs within 4 min. By finding the weight of carbon dioxide formed during the oxidation, the determination of carbon in the sinter is simultaneously carried out. The results were found to agree well with those obtained by the normal volumetric method. It was found that fayalitic FeO remained unoxidized at lower temperatures, and it is suggested that such FeO can be determined by carrying out the oxidation at two temperatures.—A. E.</p>																			
ASD-51A METALLURGICAL LITERATURE CLASSIFICATION																			
LITERATURE INDEX										LITERATURE INDEX									
LITERATURE INDEX										LITERATURE INDEX									

21

PROCESSES AND PROPERTIES INDEX

Accelerating the Analysis of Sinter. Yu. I. Usatenko and P. A. Bulakhova. (Zavodskaya Laboratoriya, 1946, vol. 18, Sept., pp. 1128-1130). [In Russian]. Details are given of rapid methods for the determination of silica, iron, and calcium in sinter; they are based on the fusion at 1000° C. of separate 0.5-g. portions of the finely powdered sample products easily soluble in hydrochloric acid. For the determination of manganese, 0.2 g. of the finely powdered sample is dissolved by boiling in 10 ml. of a mixture of 70 ml. of phosphoric acid with 30 ml. of sulphuric acid. The satisfactory accuracy of these rapid methods was established in numerous tests with samples of sinters and standard samples of ore. a. g.

ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION
REGION: SYMBIEN
SUBJECT: 21

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSING AND PROPERTY INDEX																			
<p>Photocolorimetric Determination of Silicon in Cast Irons and Steels. (In Russian.) Yu. I. Usalepko and Yu. Ya. Orlova. <i>Zavodskaya Laboratoriya</i> (Factory Laboratory), v. 15, Nov. 1949, p. 1385-1390.</p> <p>Describes method for the above using Molur's salt as the reducer to form molybdenum blue. Typical data are tabulated and charted. Special advantages are indicated.</p>																			
<p>ASB-5LA METALLURGICAL LITERATURE CLASSIFICATION</p>																			
12000 1710011111										120000 1111 0111 011									
140000 01										1111111 011 011 111									
1111111 011 011 111										1111111 011 011 111									

5

Analysis

Rapid Method for Determining Calcium and Magnesium in Dolomites, Magnesites, and Open-Hearth Slags. In: I. Usatko and O. V. Datsenko. (*Zavodskaya Laboratoriya*, 1950, No. 1, 94-96). [In Russian]. A volumetric method is proposed for the determination of calcium and magnesium, the duration of the analysis being 1.5-2 hr. The method is based on the precipitation of the components being determined by standardized solutions of sodium oxalate and dibasic sodium phosphate, the excesses of which are then determined in an aliquot part of the filtrate by titration with permanganate and hydrochloric acid. For the acid titration, a mixed indicator with a very sharp colour change has been found. --S. K.

USATENKO, Yu. I.

USSR/Minerals - Ores, Analysis

Nov 50

"Accelerated Determination of Phosphorus in Agglomerate," Yu. I. Usatenko, P. A. Bulakhova, Metallurgical Plant imeni Dzerzhinskiy

"Zavod Lab" No 11, pp 1393, 1394

Suggests method for decompn of sample of agglomerate in mixt with min amt of sodium carbonate. Same sample may serve for detn of silica. Method was verified on std samples of iron and manganese ores and on many samples of agglomerate and showed satisfactory results and considerable decrease in length of anal.

180787

USSR/Minerals - Ores, Analysis

Dec 50

"Decomposition of Agglomerates and Insoluble
Iron Ores Without Using Platinum Crucibles,"
Yu. I. Usatenko, P. A. Bulakhova, Metallurgical
Plant imeni Dzerzhinskiy

"Zavod Lab" No 12, pp 1497, 1498

Suggests obtaining soln of agglomerates and ores,
insol in acids, by preliminary sintering with
sodium carbonate. Soln in hydrochloric acid ob-
tained in 3-5 min, while ordinary method re-
quires nearly 3 hr. Sintered product is dry
mass, and sintering may be conducted on nickel
plate instead of platinum crucible.

182T102

USATENKO, YU. I.

PA 163T8

USSR/Engineering - Refractories
Chemistry - Silicates, Decomposition

Jun 50

"Rapid Method for Decomposition of Silicates,"
Yu. I. Usatenko, P. A. Bulakhova, Metallurgical
Plant imeni Dzerzhinskiy

"Zavod Lab" Vol XVI, No 6, pp 745-746

Suggests new procedure for decomposing silicates
in process of analyzing chamotte, dinas, quartz,
acid slag, clays, and other similar materials.
Quick decomposition of silicates considerably
simplifies and accelerates their complete analysis.
Determination of silica takes 1-1.5 hr.

163T8

USSR.

Determination of zirconium by amperometric titration with an indicator. Yu. I. Usatenko and G. E. Bekk-Lova (Dzerzhinskii Inst. ~~Chem.~~ ~~Chem.~~, Dnepropetrovsk, Ukrain. Khim. Zhur, 20, 690-2 (1954) (in Russian)). This method is based on fixation of Zr on Na_2ZrF_6 . Zr reacts with P more intensely than does Fe. Near the equiv. point Fe starts combining with P and this causes a change in the diffusion current observed on a galvanometer. This detn. must be carried out in an aq. soln. nearly satd. with NaCl at a pH of approx. 2.2 (slightly pink to methyl orange). If in the course of the detn. the pH changes, it should be adjusted again. Al and Be must not be present. SiO_2 , Ca, Mg, Ti, Cr, and Fe^{++} do not interfere.

M. Hesch

USSR/Chemical Technology -- Chemical Products and Their Application. Silicates.
Glass. Ceramics. Binders, I-9

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 1545

Author: Usatenko, Yu. I., Vinik, M. I., and Kalinkovich, Ye. A.

Institution: Dnepropetrovsk Chemical Engineering Institute

Title: Investigation of Solid Phase Reactions for the Purpose of Revealing
Acid Insoluble Materials

Original

Periodical: Tr. Dnepropetr. khim.-tekhmol. in-ta, 1955, No 4, 95-107

Abstract: A number of solid-phase reactions have been investigated with a view toward achieving the solution of acid insoluble compounds. A 0.5 gms sample of iron ore agglomerate (A) was sintered with 0.3 gms Na_2CO_3 at 500-1,000, in steps of 500. The analysis of A was as follows (in percent): SiO_2 , 13.4; Fe^{3+} , 44.8; Fe^{2+} , 15.9; CaO , 1.08; Mn, 0.14; P, 0.023; S, 0.011. Maximum weight loss was observed for the mixture when sintering was carried out at 900-950°. At temperatures above 950° an insignificant increase in weight was

Card 1/2

Yu.
USATENKO, Ye.I.; BEKLESHOVA, G.Ye.; GRENBERG, Ye.I.; GENIS, M.Ya.;
~~BRUBNER, Ye.Ye.~~

Amperometric determination of iron and aluminum in bronzes. Zav.lab.
21 no.1:26-27 '55. (MIRA 8:5)

1. Dnepropetrovskiy khimiko-tekhnologicheskii institut i trubopro-
katnyy zavod im. V.I.Lenina.
(Electrochemical analysis) (Bronze--Analysis)

USHENKO, Yu. I.

6000

✓ 1361. Amperometric analysis with the use of cupferron. I. Bolotin, L. I. Golun, Yu. I. Usatenko and G. E. Beklyshova (Dnepropetrovsk Univ., Dnepropetrovsk, USSR). Zashch. Prikl. Khim., 1966, 21, 10, 179-182.

Cupferron in various media in KCl or NaCl or in 0.1 to 3 N H_2SO_4 was used defined about 0.6 to 0.7 V (vs. the N.C.E.) on a rotating platinum micro-anode. The wave height is proportional to the cupferron concn. Titrant can be titrated amperometrically at 0.5 V in a standard cupferron solution prepared in a standard cupferron in a standard solution. The wave height is proportional to the cupferron concn. The wave height is proportional to the cupferron concn. The wave height is proportional to the cupferron concn.

After the addition of 5 ml of 1 per cent EDTA standard salt solution to form a complex with the Ti and the wave height is proportional to the Ti concn. The wave height is proportional to the Ti concn. The wave height is proportional to the Ti concn.

and heated in a spirit flame for 4-6 sec. One atom of Ti reacts with 2 mol. of cupferron. To determine Ti in clay, etc., 0.1 g is heated at 1000°C with 0.4 g of Na_2CO_3 for a few min. The melt is treated with water and HCl, the solution is neutralized with aq. NH₃ soln., the ppt. is dissolved by the addition of 1 or 2 drops of 6 N H_2SO_4 and sufficient excess (about 1 ml) is added to make the solution 0.2 N. After the addition of 5 ml of 1 per cent EDTA standard salt solution to form a complex with the Ti and the wave height is proportional to the Ti concn. The wave height is proportional to the Ti concn. The wave height is proportional to the Ti concn.

①

1/10
2/10

USATENKO, Yu. I.

00001

1360. Determination of iron in iron ores and agglomerates by means of EDTA (disodium salt).
 Yu. I. Usatenko and L. L. Mikhailova (Dnepropetrovsk, U.S.S.R.). *Zh. Anal. Khim.*, 1963, 21 (11), 1163-1165. The powdered ore (0.1 g) is moistened with water and dissolved in HCl. Insoluble materials are first fused with Na_2CO_3 . The acid solution is neutralised with aq. NH_3 , 1 or 2 drops of conc. HCl are added to dissolve any ppt., the solution is diluted to 100 ml, 3 drops of 20 per cent. sulphosalicylic acid are added, and the solution is titrated with EDTA (disodium salt) solution (18.61 g per litre) until the reddish-violet colour turns to lemon yellow. Sulphosalicylic acid gives a clearer end-point than does KSCN.

G. S. SMITH

①

11/22/64

USATENKO, Yuriy Ivanovich

USATENKO, Yuriy Ivanovich (Dnepropetrovsk Chemicotechnological Inst imeni Dzerzhinskiy) - Academic degree of Doctor of Chemical Sci Based on his defense, 28 March 1955, in the Council of the Moscow Order of Lenin Chemicotechnological Inst imeni Mendeleyev, of his dissertation entitled: "Accelerated Methods of Chemical Analysis of the Agglomerates of Iron ores, Silicates, and Materials obtained on the bases of Higher fire-resistant oxides of metals." for the Academic Degree of Doctor of Sciences

SO: Byulleten' Ministerstva Vysshego Obrazovaniya SSSR, List No. 3, 4 February 1956
Decisions of the Higher Certification Commission Concerning Academic Degrees
and Titles.

JPRS/NY 554

USATENKO, YU. I.

137-58-5-11146

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 321 (USSR)

AUTHORS: Usatenko, Yu. I., Bekleshova, G. Ye.

TITLE: Determination of Titanium in Steels by the Method of Amperometric Cupferron Titration (Opredeleniye titana v stalyakh metodom amperometricheskogo titrovaniya kupferonom)

PERIODICAL: Tr. Nauchno-tekhn. o-va chernoy metallurgii. Ukr. resp. pravl., 1956, Vol 4, pp 39-43

ABSTRACT: A method is developed for amperometric titration of Ti with a solution of cupferron stabilized by phenacetin (cupferron remains stable for 3 months). It is established that 1 gram atom Ti reacts with 2 gram moles of cupferron. Fe salts impede the titration process by forming a stable complex with the cupferron. When determining the Ti in clays, fireclays, and Fe-Ti, the Fe is tied up with trilon B. In analyzing steels, the Ti is separated from the basic mass of Fe by minimum quantities of cupferron (Ti cupferronate precipitates first and is followed by the Fe cupferronate). In order to obtain a readily filterable precipitate, the precipitation should be carried out in the presence of a small amount of Fe^{3+} and any desired amount of Fe^{2+} . The

Card 1/2

USATENKO, YU. A.

137-58-5-11200

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5 p 329 (USSR)

AUTHORS: Usatenko, Yu. A., Vitkina, M. A.

TITLE: Determination of Lead by the Method of Amperometric Titration
With an Indicator (Opredeleniye svintsa metodom amperometri-
cheskogo titrovaniya s primeneniye indikatora)

PERIODICAL: Tr. Nauchno-tekhn. o-va chernoy metallurgii. Ukr. resp.
pravl., 1956, Vol 4. pp 44-48

ABSTRACT: A method was developed which permitted direct ampero-
metric titration of Pb with an oxalate solution and with CuCl_2 as
an indicator. Since the solubility product (SP) of PbC_2O_4
(2.74×10^{-11}) is considerably lower than the SP of CuC_2O_4
(2.87×10^{-8}), PbC_2O_4 will precipitate out first. Near the point of
equivalence the indicator ions, Cu^{2+} , will become attached, and
the diffusion current previously occasioned by them will cease.
A rotary Pt microelectrode serves as the indicator electrode in
the titration process, while the comparison electrode is a mer-
cury iodide semi-element (+0.017 v), which makes it possible to
obtain a Cu wave without the superimposition of an external e. m. f.
The current is measured by a galvanometer. The titration is

Card 1/2

479. Determination of chromium in chromites, based on oxidation of sintering. ²⁾ In I. I. Zhukovskiy and E. A. Khudakov. *Trudy Dnepropetrovsk. Khim. Tekhnol. Inst.*, 1956, (3), 166-169. Ref. Zh. Khim., 1957, Abstr. No. 41,466. On sintering chromite with a mixture of soda lime and Na_2CO_3 or a mixture of H_2O and Na_2CO_3 , oxidation of Cr to Cr^{VI} takes place. Cr may be determined in the soln. obtained from the sintering by titration with FeSO_4 . ²⁾

E. D. KOFKIN

NS 11.